

# SAFE CHAIN SAW USE LINKED TO TECHNIQUE, SIZE

Adapted from a soon-to-be-released audio/visual program by the National Arborist Association, "Chain Saw Safety and Use." This is the latest of eleven audio/visual programs by NAA to aid in training professional arborists.

Although chain saws have made the work of the arborist easier, improper use can result in personal injury. The potential for accidents seems to have increased in direct proportion to chain saws decreasing in weight.

In 1976, chain saws were responsible for 76,000 reported accidents ranging from cut fingers to sudden death. These figures include all chain saw users, from occasional users to professional arborists.

Selecting the proper chain saw for the job at hand is a primary consideration. The weight, horsepower and length of the bar are important factors.

The greater the horsepower and larger the engine, the more the chain saw will weigh.

Large chain saws with long bars are best used for heavy cutting of large wood and in felling operations. Medium-size saws are for light cutting, bucking and limbing. Light-weight saws are used primarily for pruning up in the tree.

Chain saws are almost all driven by two-cycle, gasoline engines which power a sprocket driving the chain around the bar. Some chain saws have direct drive, from engine to sprocket. Others obtain more power by transferring engine power to the chain through a gear box. Other saws are powered by the hydraulic system from an aerial lift device.

Following the manufacturer's recommendations is essential for good maintenance. This is particularly true of the fuel mixture.

The chain and bar must be well lubricated with oil especially designed for this purpose. All chain saws have an oiler device which allows the operator to pump lubricating oil onto the bar while the saw is in operation. Some have automatic oilers. Always be sure that the oil tank is full as the oiler is a safety device as well as a means of preventing excess wear.

Chain saws perform best at high revolutions per minute (RPM). Always be sure that the chain is moving before making contact with the wood. Never overload or cause lugging of the engine.

Peak performance depends upon chain condition. The chain should be properly filed as per the manufacturer's directions. The tension of the chain should never be so tight that it prevents moving of the chain with your hand or so loose that it exposes the drive links on the underside of the guide bar when in the rest position. Never allow the chain to come in contact with sand or dirt as this causes cutting edges to become dull. A sharp chain cuts faster, easier, and more safely.

The bar grooves should be cleaned frequently to remove any buildup of grit, and the bar should



**When two men** are using chain saws at the same time, they should be at least ten feet apart and aware of each other's movements.

be turned from time to time to prevent uneven wear.

The air filter should be cleaned daily, as well as the cooling fins and sprocket. Use mineral spirits, not gasoline, to clean these parts as a safety measure.

All bolts and nuts should be kept tight and the muffler should be inspected frequently for repair or replacement.

The sprocket should be checked for wear weekly. A worn sprocket causes unnecessary wear of the chain. A good rule of thumb is to replace the sprocket every time the chain is replaced.

Trigger throttles, handles, chain brakes, and safety tips are all safety features available for chain saws. To be effective they must be used properly.

When refueling a chain saw, use a funnel or flexible nozzle to avoid spillage on the engine. If there is spillage, the engine should be thoroughly cleaned before starting. Smoking while handling fuel anytime is hazardous. Never refuel a chain saw on grass because any spilled fuel will cause turf damage. It is a good rule to be at least ten feet from the refueling site before restarting the chain saw.

Gasoline should always be kept in a safety gas container. Never use plastic or glass bottles and keep the container in a truck compartment designated specifically for this purpose.

When using a chain saw, personal protective equipment must be worn. This includes work gloves, hard hat, and safety shoes. Eye protection must be worn to guard against flying debris and dust. Ear protection should be worn if there will be prolonged exposure.

A person qualified to give first aid in the event of an accident should be available during use of a chain saw. Qualifications should be a Red Cross, Multi-Media or Bureau of Mines first aid course or equivalent. A physician approved, well-stocked first aid kit should be available also. This kit should be inspected weekly to be sure that it is well-stocked and a record made of each inspection.

In order to handle a chain saw safely, the operator should be well trained. This training should begin with the operator becoming familiar with the information in the saw manufacturer's operations manual as well as the employer's safety manual.

A new employee should observe chain saw operation before being allowed to actually operate one. After observation and complete instruction, the employee can be allowed to operate a chain saw under close supervision.

Only when the employee has demonstrated a thorough knowledge of the saw and its safe operation to the supervisor, should he be allowed to use it unsupervised.

A pre-job briefing by a supervisor or foreman informing crew members of hazards that pertain to that particular job adds to chain saw safety.

A chain saw operator should never work alone and always be conscious of these requirements:

- the space around the area of use should be clear of brush and debris.

- the operator should have secure footing and the chain saw should be firmly supported. Operating a chain saw above shoulder height should be avoided.

- start the engine and operate the chain saw only when all co-workers are clear of the saw. Hold the saw with both hands and allow the saw to warm up before cutting.

- when changing location, the chain saw should be carried with the blade to the rear and with the hot muffler away from the body. Never carry a chain saw on your shoulder or with the chain in motion. If you are moving any distance, or if you let the saw down, stop the engine.

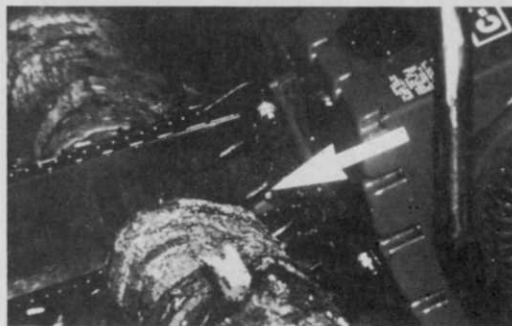
- always be sure that the chain stops rotating around the bar when the throttle control trigger is released.

- proper stance is important for safe operation of a chain saw. The left elbow should be straight with the thumbs on the underside of the handlebar. The body should be entirely to the left of the force and reaction of the chain saw so as to prevent any upward movement of the chain saw from striking the operator's body.

- on steep slopes, the chain saw operator should always stand on the uphill side to prevent logs from rolling into him.

### Binding

Binding of the saw occurs during cutting when the weight of the wood being cut causes the wood to close on the chain. This can be avoided during tree removal operations by placing a malleable metal or



**Bucking bar** (top) adds leverage to cutting. You should not be able to see the drive links on the underside of the cutting bar with the chain in the rest position if the chain has proper tension. (above, lower)

plastic wedge in the back cut pointing in the intended direction of fall. After the wedge is firmly seated with a sledge hammer, cutting can resume until the tree is ready to fall.

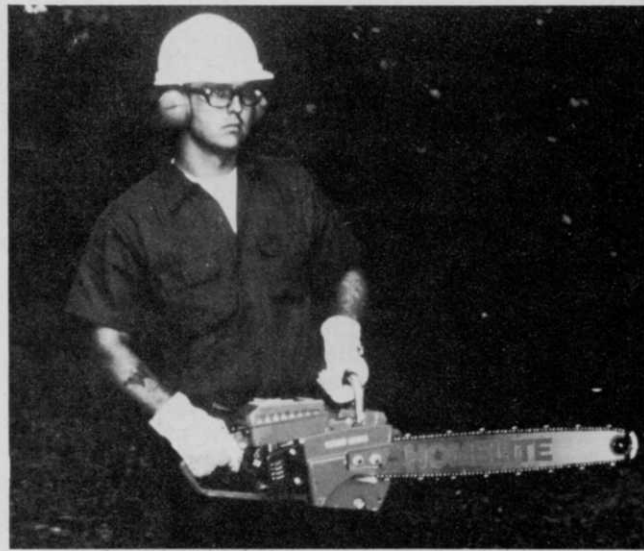
Bucking is the cutting of large limbs or trunks of felled trees on the ground. Binding can occur here also. To avoid this, undercut one-third of the diameter of the piece and then cut through from the top. Most chain saws are equipped with spikes on front of the engine. This is commonly called a bucking bar and acts as a pivot point to apply leverage for cutting.

When limbing or removing the branches from a felled tree or large limb, leave the large lower limbs to support the log off the ground. Branches under tension are very dangerous and should be cut on the outside of the arc or curve. When a fallen tree is supported by a limb or sapling acting as a spring pole, extreme caution must be used. If possible, roll the log over with a peavey to relieve the pressure. If this is not possible, keep your feet clear and cut the limb close to the trunk and on the outside of the curve. If you cut on the inside of the curve, the saw will bind. If the limb is large enough to hold the log well off the ground, the situation becomes more dangerous and the cutting must be done so that if the log moves, it moves away from the chain saw operator.

Only experienced personnel should use a chain saw aloft in a tree.



**Wedge behind saw** in cut prevents chain binding (left). Protective clothing (right) includes gloves, hard hat, and eye and ear protection.



Chain saws weighing more than ten lbs. service weight should be attached to a line crotched separately from the operator's and in such fashion so that in the event of the operator releasing the chain saw, it would swing away.

Saws weighing less than ten lbs. can be attached to the operator's belt by a lanyard that would allow the saw to come to rest below the operator's feet in case it fell.

When operating a saw in an aerial lift, it should always be started outside of the basket.

### Other NAA Programs

Chain Saw Use and Safety is the latest program constructed and made available by the National Arborist Association. You do not have to be a member to purchase these programs. The cost for each program, which includes a cassette tape of instructions and a tray of slides, is \$50 for nonmembers and \$25 for members. Besides Chain Saw Use and Safety are:

1. Basic Instruction for Tree Care Trainee
2. Tree Climbing Techniques
3. The Reasons for Pruning
4. Tools and Techniques of Pruning
5. The Reasons for Fertilizing Trees & Shrubs
6. Tools and Techniques of Fertilizing Trees & Shrubs
7. Tree Removal Techniques
8. Technique of Spraying
9. Professional Spraying Operations
10. Technique of Cable Bracing

For further information, contact the National Arborist Association, 3537 Stratford Rd., Wantagh, NY 11793.

### Kicking back

Most chain saw accidents are a result of the saw kicking back. This can occur if the chain suddenly hits a solid object or takes too large a cut. The chain stops for an instant transferring the engine torque to the bar and engine. The direction of the reaction depends upon where contact is made along the guide bar.

If the contact is made at the upper part of the bar nose, the reaction will be an upward arc toward the operator. If the contact is on the lower part of the bar nose, the reaction will be a pull away from the operator. In either case, proper hand holds and stance can prevent an accident from kickback.

To give you some idea of the power of a chain saw, the RPMs of a chain saw can drive a chain 24 mph with 1,100 lbs. of thrust with a potential kickback speed seven-and-a-half times faster than the reaction time of a human being.

Slicing cuts occur when a chain saw slices through a limb or log unexpectedly striking the operator. Alertness and proper stance can also prevent this.

If two workers are operating chain saws, a minimum distance of ten feet should separate the two. A worker should never approach a chain saw operator until his presence has been acknowledged by the operator.

Keeping a chain saw clean and storing it properly are very important. A chain saw and its fuel should be stored in the lowest compartment on the truck to prevent seepage of fuel onto ropes and supplies.

A chain saw safety program can only cover safety in a general way. Each chain saw operator has a responsibility to himself to function safely and each supervisor or manager has a responsibility to employees to instill a desire to follow safe work practices. Carelessness can and will result in injury.

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